THURSDAY, NOVEMBER 16, 1916.

NORTHERN COUNTIES LORE.

(1) *Highways and Byways in Galloway and Carrick.* By the Rev. C. H. Dick. Pp. xxix + 536. (London: Macmillan and Co., Ltd., 1916.) Price 6*s*. net.

(2) *Cleator and Cleator Moor: Past and Present.* By the Rev. Cæsar Caine. Pp. xviii + 475. (Kendal: Titus Wilson, 1910.) Price 21*s*. net.

(1) GALLOWAY, comprising the county of Wigtown and the Stewartry of Kirkcudbright, is probably less pervaded by tourists than any other attractive part of Scotland. Messrs. Macmillan have done well to commit to the Rev. C. H. Dick and Mr. Hugh Thomson the task of dealing with this district in their admirable "Highways and Byways" series, for these two gentlemen between them, one with his pen, the other with his pencil, have produced an ideal volume—not a guide-book in the ordinary sense so much as a *vade mecum* for the traveller. Mr. Dick, while not neglecting the highways, finds his chief delight in the byways and in those great tracts of moorland and mountain which constitute the southern upland of Scotland. Here he pursues his leisurely way, dropping off his bicycle at little wayside inns and lonely shepherds' cottages, at solitary pele-towers and immemorial kirkyards, wherever he may glean armfuls of legendary and historic lore. Galloway was the chief stronghold of the westland Whigs; memorials of the heroes and martyrs of the Covenant are as holy in his eyes as the sculptured crosses of the primitive Celtic church or the ruins of such noble fanes as Sweetheart and Dundrennan.

> Grey recumbent tombs of the dead in vacant places,
> Standing stones on the vacant wine-red moor,
> Hills of sheep, and the homes of silent vanished races,
> And winds austere and pure.

The killing, however, was not all done by Claverhouse and Lagg. The Covenanters did not shrink from shedding blood on occasions.

"Carsphairn abounds in hills of sheep and has its circle of standing stones, but is the only parish in the Glenkens where there is no martyr's grave. The village, however, has its story of the killing time. Pierson, the Episcopal minister, maintained a persecuting policy towards the Covenanters in the parish, and kept Lagg informed of those who absented themselves from church. The people were not cowed, but merely exasperated, and, led by James MacMichael, proposed to make some sort of treaty with the minister to secure peace in the parish. Pierson received a deputation in the manse, but on learning their errand was enraged, would listen to none of their remonstrances, barred the door, and drew out his pistol. Companions of the deputies, who had remained outside, hearing cries from within, broke down the door with MacMichael at their head. He, seeing the pistol outstretched and conceiving his friends to be in imminent danger, shot Pierson dead."

In treating of the scenery of Galloway Mr. Dick deals only with its external beauties and its association with legend and history. In a single volume so full of interesting matter it would be too much to expect detailed notice of fauna and flora. The geology of the district has been admirably explained in Sir Archibald Geikie's "Scenery of Scotland." There is, however, one feature which has long occupied the attention of geologists and deserves notice in any traveller's handbook. The prevailing formation in this region is Lower Silurian, the beds of which are tossed to a height of 2764 ft. in the Merrick, the loftiest summit in southern Scotland. Twelve miles S.S.W. of Merrick stands Cairnsmore-of-Fleet, 2331 ft., an intrusive mass of granite, altering the Silurian beds around it. On the very summit of Merrick lie many huge blocks of Cairnsmore granite, some of them as big as a small cottage. Ice-borne, no doubt, but how have they been carried to an elevation 400 ft. greater than that of the hill whence they came? The easiest explanation is that Cairnsmore has lost much of its original height by sub-aerial denudation.

We have but a single fault to find with Mr. Thomson's masterly pencil sketches, namely, that in his otherwise accurate drawing of the Peter Stone at Whithorn (p. 239) he has left out the Chi-Rho loop on the right of the upper limb of the cross. This is a serious omission, seeing that this feature, derived from the Emperor Constantine's *labarum,* occurs only on two other sculptured stones in Scotland, both in Galloway.

(2) Very different in scope and purpose from Mr. Dick's rambling notebook is the Rev. Cæsar Caine's "Cleator and Cleator Moor," which is a record, historical, industrial, geological, and biographical, of this famous ironfield. The earliest documentary evidence of iron-mining in West Cumberland is a deed of gift by William Earl of Albemarle, who died in 1179, of a mine at Egremont and a forge at Wynefell to the Abbey of Holm Cultram; but relics of the industry in prehistoric and Roman times have been found at Cleator and Furness. Mr. Caine discusses the various theories about the formation of hæmatite ore, such as aqueous deposition in solution, igneous injection, and chemical displacement or substitution, and agrees with J. D. Kendall in regarding the metasomatic replacement of limestone by ferrous carbonate as the prevailing cause, while less frequently hæmatite has probably been deposited in fissures by filtration.

The output from the Cleator mines shows so serious a falling off, namely, from 4,505,951 tons in the decade 1871–80 to 1,266,208 tons in the decade 1901–10, as to indicate the approaching close of the industry at no very distant date. Mr. Caine, however, looks forward to a day when "a man with large means and equal courage to carry out his ideas may bore through the coal measures which are known to overlie the car-

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boniferous limestone in a large part of the neighbourhood of Cleator and find immense bodies of ore to reward him."

It is claimed for the Cleator Linen Thread Mill (now included in the great Thread Combine) that it is "the oldest flax-spinning mill in the country, and perhaps in the world." Winding thread on spools was first started here, the thread having previously been done up in hanks. It is strange, therefore, that Mr. Caine, in a dissertation upon place-names, should seek to connect that of a field close to the mill, Linethwaite, with the Anglo-Saxon "linde," a lime tree. It is plain Norse for "flax-field"—*lin-thveit*. A list of the flora and fauna of Cleator is given in an appendix, but it is valueless for any scientific purpose, inasmuch as none but English popular names are given. It does not carry one very far to be told that in this parish are found the linnet, the goose, the orchis, the gentian, etc., with no indication of species.

A COMPOSITE AMERICAN TEXT-BOOK OF GEOLOGY.

A Text-book of Geology. By Prof. L. V. Pirsson and Prof. C. Schuchert. Part i., *Physical Geology.* By Prof. L. V. Pirsson. Pp vii + 444. Price 10*s.* net. Part ii., *Historical Geology.* By Prof. C. Schuchert. Pp. vi + 405–1026. Price 12*s.* net. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1915.)

GEOLOGY, being such a many-sided science, is especially handicapped in regard to text-books. It is provided with a library of books dealing with its various subdivisions and aspects, but the provision of an up-to-date manual which deals with the whole range of the subject in about a thousand pages, and of the standard required by students in higher technical schools and by those taking geology as a secondary subject in universities, is a perennial difficulty. Specialisation in geology has gone so far that it is becoming impossible for any one author to deal with the whole science in the detail required in such a work. The new text-book of geology by Profs. Pirsson and Schuchert, with chapters by Profs. Barrell and Lull and Dr. Ulrich, show the effort to overcome this difficulty by joint authorship. That method has its own drawbacks, for it is very difficult thus to secure that unity of view and uniformity of standard which are indispensable in an educational text-book.

The first part of this work, by Prof. Pirsson, deals with physical geology. It is divided into two divisions, dynamical and structural, and in the course of 400 pages gives a most excellent summary of these subjects. Its illustrations are numerous and clear, and are all useful. Those illustrating the geological conditions of arid regions are especially good. His account of the igneous rocks is short and conservative, and British teachers may be grateful for the fact that he does not mention the American classification or adopt its terminology. A few relatively unimportant slips occur, such, for example, as the remark on p. 178 that the one boring in a coral atoll in the Pacific shows a thin cap of coral "on the volcanic rock which forms the main mass." The author attributes (p. 79) the fact that the Caspian is fresher than ordinary seas to the precipitation of its salt in Karabugas; but it would appear more probably due to the former dilution of the Caspian by the Volga. Prof. Pirsson introduces into geology the term "nonconformity" for those varieties of unconformity in which the dip of the formations is visibly different; for the other section of unconformities he accepts Grabau's term of disconformity. His description of potholes as a minor feature would appear to underrate their significance, for their formation is probably the main process by which mountain streams deepen their valleys in hard rock.

The chapter on the formation of mountains is one of the most interesting in the volume. In spite of some American opinions to the contrary, the author concludes that the crust is contracting in consequence of the lessened volume of the earth as a whole; and he is disposed to attribute the shrinkage, not to cooling, but to chemical changes in the internal material. He adopts also the steadily growing view that crustal movements occur with a rhythmic periodic progression; but the author will surprise many of his readers by his conclusion that the earth, "except locally or to a superficial depth, may not be hot, at least in any such sense that it could experience the notable contraction from loss of heat demanded for the origin of the folded ranges" (p. 366). The author refers to recent suggestions throwing doubt on the origin of the West American block mountains by faulting; but he concludes that the dominant processes in the formation of many, if not most, of these ranges are the faulting of the region and the tilting of the blocks. In his classification of mountains it is perhaps a pity that the author has not adopted the usual sequence of terms. He reverses the order of chain and system, and represents several mountain systems as forming a mountain chain; and he continues that a combination of mountain chains constitutes a cordillera. The term "cordillera" seems best restricted to a mountain system such as the Andes, composed of parallel chains.

Prof. Schuchert's part of the work, which is also published as a separate volume, consists of a most interesting series of essays. But it would appear of less use to British students as a college text-book than the first part. It is overweighted at the start by the long hypothetical pre-geological history of the earth. The arrangement of the material, and such illustrations as the portraits of geologists, are less suitable for the technical student than for the general reader; thus most students would probably have found it more convenient to have the descriptive palæontology all

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